

mode mask defines that the first  $w/2$  pixels in the row are printed in the same pass ( $a_i$ ), and the last  $w/2$  pixels in the row are printed in another pass ( $b_i$ ); and examining the diagnostic plot to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

**REMARKS**

The Examiner is thanked for the careful review of the application as set out in the outstanding office action. Reconsideration of the application is respectfully requested.

A marked up version of the changes made to the application is attached hereto.

### Allowable Subject Matter

Claims 8, 15 and 17 stand as objected to as dependent upon a rejected base claim, but as allowable if rewritten in independent form including all limitations of the base claim and any intervening claim.

Claims 4, 6, 9, 13, 18 and 20-22 have been allowed.

The indication of allowable subject matter is appreciated. Claims 8, 15 and 17 have amended to place them in independent form, and are believed to be in condition for allowance. Applicants note that Claims 8 and 17 do not include the limitation of Claims 7 and 16, "each pixel location having a number associated therewith, the number representing the pass in which the pixel will be printed."

## Claims Rejections - 35 USC 102 (Dunand)

Claims 1, 2, 5, 10, 11 and 14 have been rejected as being "obvious" by Dunand. Applicants believe that, since the rejection is under Section 102, these claims are rejected as being anticipated by Dunand.

Dunand describes a process for compensation of a defect in the advance of a print substrate by modifying the arrival position of ink droplets with a variable electrical charge on the substrate. Each band of droplets is printed with a mark on the margin or edge of the substrate, the substrate is advanced to print the next band, an algebraic difference is determined between a nominal theoretical position of the mark and the real position of the mark, a correction to the value of the charge voltage to be applied to each droplet to compensate

for the position error is determined, and the substrate correction is applied to each droplet in the next band, in addition to the nominal voltage. (Abstract) Thus, the printing of the mark is performed during printing of normal print jobs.

Claim 1 has been amended to recite that the method includes entering a diagnostic mode of the printing system in which mode normal printing jobs of the printing system are not printed. Dunand clearly does not disclose entering such a diagnostic mode.

Claim 10 has been amended to recite that the diagnostic mode is one in which normal printing jobs of the printing system are not printed. Dunand does not describe such a diagnostic mode.

Claim 3 has been amended for the sole purpose of placing the claim in independent form. The Examiner states regarding Claim 3 that "said different areas are nominally aligned along a horizontal line (FIG. 8)." Applicants respectfully disagree that Dunand describes each element of Claim 3. Dunand does not describe for example

printing different areas of a diagnostic pattern at different passes of one or more ink-jet printheads with a controlled amount of media advances between the passes, to accumulate media advance error between the printing of the different areas, wherein said different areas are nominally aligned along a horizontal line

Each mark in Dunand, FIG. 8, is printed in a single pass, not at different passes.

Because each element of the rejected claims, including the claims depending from Claims 1 and 10, is not described by Dunand, the rejection under Section 102 should be withdrawn.

#### Claims Rejections - 35 USC 103

Claims 7 and 16 stand rejected as being unpatentable over Dunand in view of Maeda. This rejection is respectfully traversed on the ground that a *prima facie* case of obviousness has not been established, and the references do not teach or suggest the invention of these claims.

Dunand has been discussed above, and similar considerations apply to the claims under rejection based on Section 103.

Maeda discloses a multi-scanning printing method, using masking patterns to suppress color bleeding between adjacent pixels.

The Examiner asserts that it would have been obvious to include the applying of a diagnostic multi-pass print mode mask as designed by Maeda into the advance control process of Dunand. The alleged motivation is that this reduces the formed bind pitch to less than paper transport width without increasing the number of scans, thus the banding artifacts are imperceptible as taught by Maeda at 4:4-10. Applicants respectfully disagree with this holding.

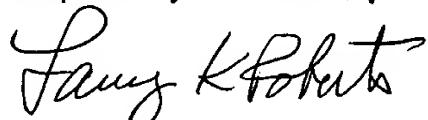
Even if the references are combined, the claimed invention is not obtained. Dunand is directed to a printer and process for substrate advance control, wherein for each band, marginal lines are drawn which are used to subsequently correct voltages applied to droplets to correct for error in the substrate advancement direction. Maeda describes a method of printing the data part of the swath, not a diagnostic plot. There is therefore no reason to combine the teachings of the two references, and even if the combination is made, the features of the rejected claims do not result.

Withdrawal of the rejection under Section 103 is respectfully requested.

### CONCLUSION

The outstanding objections and rejections have been addressed, and the application is in condition for allowance. Such favorable reconsideration is solicited.

Respectfully submitted, /



Larry K. Roberts  
Registration No. 28,464

Dated: 4-3-03

P.O. Box 8569  
Newport Beach, CA 92658-8569  
Telephone (949) 640-6200  
Facsimile (949) 640-1206

VERSION WITH MARKINGS TO SHOW CHANGES MADEIN THE CLAIMS

1. (Amended) A diagnostic method for visual detection of poor media advance calibration in an ink-jet printing system, comprising:

entering a diagnostic mode of the printing system in which mode normal printing jobs of the printing system are not printed;

printing different areas of a diagnostic pattern at different passes of one or more ink-jet printheads with a controlled amount of media advances between the passes, to accumulate media advance error between the printing of the different areas; and

examining the diagnostic pattern to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

3. (Amended) [The method of Claim 1] A diagnostic method for visual detection of poor media advance calibration in an ink-jet printing system, comprising:

printing different areas of a diagnostic pattern at different passes of one or more ink-jet printheads with a controlled amount of media advances between the passes, to accumulate media advance error between the printing of the different areas, wherein said different areas are nominally aligned along a horizontal line; and

examining the diagnostic pattern to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

8. (Amended) [The method of Claim 7,] A diagnostic method for visual detection of poor media advance calibration in an ink-jet printing system, comprising:

printing different areas of a diagnostic pattern at different passes of one or more ink-jet printheads with a controlled amount of media advances between the passes, to accumulate media advance error between the printing of the different areas, said printing different areas of a diagnostic pattern comprising applying a diagnostic multi-pass print mode mask, wherein a plurality of carriage passes are employed to print the area subtended by a printhead nozzle array, the diagnostic print mode mask comprising a rectilinear grid of pixels, and

wherein said different areas include a first set of pixels on a row of said grid, and a second set of pixels on said row, and wherein said first set of pixels is printed on a different pass than said second set of pixels is printed, and wherein said diagnostic print mode mask defines that the first  $w/2$  pixels in the row are printed in the same pass (a), and the last  $w/2$  pixels in the row are printed in another pass (b); and

examining the diagnostic pattern to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

10. (Amended) A diagnostic method for visual detection of poor media advance calibration in an ink-jet printing system, comprising:

providing an ink-jet printhead mounted on a carriage, the carriage mounted for movement along a scan axis;

providing a media advance system for advancing a print medium along a media path which is transverse to the scan axis;

entering a diagnostic multi-pass print mode in which mode normal printing jobs of the printing system are not printed;

printing different areas of a diagnostic plot at different passes using said ink-jet printhead with a controlled amount of media advances between the passes to accumulate media advance error between the printing of the different areas; and

examining the diagnostic plot to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

15. (Amended) [The method of Claim 10, further comprising an initial step of] A diagnostic method for visual detection of poor media advance calibration in an ink-jet printing system, comprising:

providing an ink-jet printhead mounted on a carriage, the carriage mounted for movement along a scan axis;

providing a media advance system for advancing a print medium along a media path which is transverse to the scan axis;

entering a diagnostic multi-pass print mode;

checking for printhead health and taking any corrective needed action prior to printing [said] a diagnostic pattern;

printing different areas of the diagnostic plot at different passes using said ink-jet printhead with a controlled amount of media advances between the

passes to accumulate media advance error between the printing of the different areas; and

examining the diagnostic plot to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

17. (Amended) [The method of Claim 16,] A diagnostic method for visual detection of poor media advance calibration in an ink-jet printing system, comprising:

providing an ink-jet printhead mounted on a carriage, the carriage mounted for movement along a scan axis;

providing a media advance system for advancing a print medium along a media path which is transverse to the scan axis;

entering a diagnostic multi-pass print mode;

printing different areas of a diagnostic plot at different passes using said ink-jet printhead with a controlled amount of media advances between the passes to accumulate media advance error between the printing of the different areas, said printing different areas of a diagnostic plot comprising applying a diagnostic multi-pass print mode mask, wherein a plurality of carriage passes are employed to print the area subtended by a printhead nozzle array, the diagnostic print mode mask comprising a rectilinear grid of pixels, and wherein said different areas include a first set of pixels on a row of said grid, and a second set of pixels on said row, and wherein said first set of pixels is printed on a different pass than said second set of pixels is printed, wherein said diagnostic print mode mask defines that the first  $w/2$  pixels in the row are printed in the same pass (a<sub>i</sub>), and the last  $w/2$  pixels in the row are printed in another pass (b<sub>i</sub>); and

examining the diagnostic plot to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.